Remarks/Arguments

This paper is submitted in response to the Office Action mailed October 19, 2004. A Request for a One-Month Extension of Time under 37 CFR 1.136(a) is submitted herewith, along with the fee prescribed by 37 CFR 1.17(a)(1). The response is therefore timely.

Claims 1-31 were examined and rejected. By this amendment, claims 1-3, 6-11, and 23, 24, and 26-31 have been amended, claims 32-40 have been added, and claims 4, 5, 12-22, and 25 have been canceled. In view of the above amendments, reconsideration of the application is respectfully requested.

Rejection under 35 U.S.C. §102(a)

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by the prior art as admitted in the instant application.

Claim 1, as amended, now recites a control signal system in a switch including N ports and a buffer for registering data packets comprising: an empty buffer counter for counting how much space said buffer remains available, and N port-packet-counters for respectively counting how many said data packets in said buffer are intended to be respectively sent to specific ones of said N ports, wherein said control signal system is a flow control signal system for controlling a flux of said data packet to be sent to said specific ones of said N ports. Claim 1 has been further amended to define the invention as further comprising an alarming device for alarming that said N ports have reached a threshold state.

The components of the control signal system in the present invention include N ports (port 1, port 2,..., port N) in a flow control signal system. The flow control signal system further includes an empty buffer counter (EBC), N port-packet-counters (PPC), and N alarm units therein. As defined in several of the dependent claims, the N alarm units further include N comparators and N flow control signal generators corresponding to the N comparators. When comparing the components of the control signal system in the prior art, a traditional network

switch in the prior art includes N input/output ports, an empty buffer counter, N port flow controllers, and N port packet counter sets which are implemented by N-1 port-to-port counters. Therefore, the network switch in the prior art needs an empty buffer counter and N(N-1) counters, (i. e. N port packet counters set multiply (N-1) port-to-port packet counters) to accomplish the functions of flow control.

Accordingly, the component named "port 1 packet counter" in the prior art includes N-1 counters used for respectively counting the number of the data packets in the switch to be sent into the port 1, while in the present invention, the component named "port 1 packet counter" (abbreviated PPC1) without any other counters therein, is used for counting how much space in a buffer remains available.

Therefore, there are at least two major differences between the admitted prior art and the present invention: First, there are different numbers of counters in the components of the "port packet counters" in the prior art, i.e. "port packet counters" with N(N-1) counters, and in the present invention, i.e. "port packet counters" with N counters, as described above. Second, the alarm units in the present invention are a major technical feature, and this feature is lacking in the prior art. Clearly, the technical features of the present invention, as defined in claim 1, are patentably distinct from those of the prior art, and therefore, claim 1 should be patentable over the prior art.

A third difference (as defined in claim 2) is the buffer stack in the present invention. In the prior art, there is a buffer for storing the transmitted data packets, while in the present invention, as defined in claim 2, the storing place for the data packets is the buffer stack in the buffer unit, which is shown in Fig. 2 as element 20. Therefore, the flow control signal system in the present invention could perform in real time for responding to the state of the flow rate and the flow direction of the data packets, a result that could not be achieved in the prior art. For this reason, claim 2 should be patentable, along with claim 1.

Rejection under 35 U.S.C. §102(e)

Claims 12, 13, 17-24, and 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by US No. 6,405,258 – Erimli et al.

Claims 12 and 17-22 have been canceled. Claim 23 has been amended to add the subject matter of claim 25, which has been canceled. Claims 24 and 29-31 depend from claim 23 as amended. New claims 32-40 have been added. It is respectfully submitted that claims 23, 24, and 29-40 are patentable, for the reasons set forth below.

First, regarding new claim 32: This claim recites a method for processing a flow control signal in a flow control signal system in a switch having N ports and a buffer stack. The method includes the steps of: (a) sending a data packet to be sent to a first port from a network and storing the data packet into one of a plurality of buffer implements disposed in the buffer stack; (b) deducting 1 from an empty buffer counter disposed in the switch and adding 1 to one of N port-packet-counters corresponding to the port set in the flow control signal system; (c) respectively computing whether both values of the empty buffer counter and the port-packet-counters are less than a buffer-examined threshold and greater than a port-packet-examined threshold; (d) announcing an alarming state for informing that the data packets from network to be sent to the first port will be filled; (e) finding a second data packet from a second port to be sent to the first port; (f) sending and storing the second packet into another buffer implement of the buffer stack, and triggering one of (N-1) alarm units corresponding to the second port for stopping other data packets from source ends connected with the other ports in the network transporting to the switch; and (g) repeating steps (a)-(f) after the alarming state is removed to process the data packets to be sent to the first port until all data packets in the switch have been processed.

Accordingly, the working status of the switch controlled by the flow control signal system is determined by the value of the buffer-examined threshold in the present invention. If the amounts of transmitted data packets are larger than the maximum value of the buffer-examined threshold, the data packets could not be transmitted into the ports of the switch controlled by the flow control signal system in the present invention. The step (d) of announcing an alarming state

for informing that the data packets from network to be sent to the port will be filled, is not shown in Erimli et al.

It is therefore respectfully submitted that claim 32 defines patentably over the admitted prior art in view of Erimli. Claims 33-40 depend from claim 32, and further define the novel and patentable features of the invention. For example, claim 38 further defines step (d) as being performed by N alarming units, while claim 39 further defines step (f) as comprising a comparing step and a triggering step performed by N comparators and N flow control signal generators. Furthermore, as set forth in claim 39, one of N comparators in the alarm units is judging the status of the alarm units and sending a triggering message to one of N signal generators when an alarming state is announced. This step is described as in the step (f) for sending and storing the second packet into another buffer implement of the buffer stack, and triggering one of (N-1) alarm units corresponding to the second port for stopping other data packets from source ends connected with the other ports in the network transporting to the switch. The one of N signal generators is to be triggered by the triggering message for sending a flow control signal to another one of N ports corresponding to the source port coding number of a data packet.

Erimli et al., at column 12, lines 1-7, recites "a saturation level [that] corresponds to a level that, if exceeded, can result in a loss of data by a particular port of the network switch 12." The reference only mentions that if the data reaches the saturation level of the network switch, it could result in a loss of data, but it does not mention that there is an alarming unit informing the situation of the switch, as does the flow control signal system of the present invention, which includes the alarming unit. In column 3, lines 25-27, Eremli et al. recites that the arrangement of the reference "includes a receive port, a transmit port, a programmable threshold register, and control circuitry." In column 3, lines 29-32, it recites that the "programmable threshold register is used to store a threshold value that indicates a saturation level for the internal resources of the transmit port." Therefore, the programmable threshold register is only for determining the threshold value for the saturation level indication of the transmit port.

Furthermore, according to the above discussions, the Eremli et al. reference does not disclose an alarming device, whereas the network switch in the present invention contains the N alarming devices, which include N comparators and N flow control signal generators, for informing that the data packets from the network to be sent to the first port will be filled as taught in the step (d) and the step (f) as above. With the alarming units in the flow control signal system in the present invention, it will trigger a signal to stop the data packets transmission when the amounts of the data packets would be overfilled. Therefore, the data packets would not be missed in the present invention. The other benefit of the alarming units is that it could be applied in the real time response for representing the status of the switch.

There is another difference between the Eremli et al. reference and the present invention, i. e. the technical features of the flow controlling system, as defined in claim 32-40. In the Erimli et al. reference, the flow controlling system in the switch includes the threshold registers 500, the PAUSE registers 520, a host CPU 32, an output queue 58, and a control logic 96. In the present invention, the flow controlling system in the switch includes an empty buffer counter, N port-packet-counters, an alarming means, a triggering means, and a processing means. Clearly, the components in the two inventions are different. The flow controlling system in the present invention includes the empty buffer counter and N port-packet-counters which could control the flux of the data packets on each specific port in real time and monitor the space in the buffer with fewer counters. According to such clear differences between the reference and the present invention, claims 32-40 would be patentable over the admitted and cited prior art.

Claim 23, as amended, recites a controlling medium for controlling a transmission of data packets in a flow control signal system in a switch having N ports and a buffer therein comprising: a storing means, a computing means including an empty buffer counter and N port-packet-counters, an alarming means, a triggering means, and a processing means. As amended, claim 23 defines the computing means as one that counts a flux of the data packet to be sent to the specific port, "wherein the flux in the computing means is down-counted by an empty buffer counter counting how much space in said buffer remains available and up-counted by one of N port-packet-counters respectively counting how many the data packets in said buffer are intended

to be respectively sent to specific ones of said N ports." As also defined in claim 1, the alarming means causes an alarming state for preventing the specific port from being overfilled up with the data packets. The triggering means triggers a message to stop any data packet sent to the specific port from being transmitted into the switch.

In Erimli et al., in column 12, lines 1-7, it is recited that the control registers 52 include a set of threshold registers 500 for storing watermark thresholds, or saturation levels, for the internal resources of the output ports of the network switch 12. At column 12, lines 15-17, the reference teaches that the watermark threshold levels identify a maximum number of entries that are allowed in the specified output queue 400. As described in this reference, the watermark thresholds are just some values stored in the threshold registers 500. The reference doesn't teach how to determine these values. In the present invention, the technical features of the flow control system of the data packets in the switch are determined by the computing means, which contains the empty buffer counter for counting how much space in the buffer remains available, and one of N port-packet-counters for respectively counting how many the data packets in the buffer are intended to be respectively sent to specific ones of the N ports. Therefore, the functions of the switch in the present invention include not only triggering the message to stop the data packet transmitted into the switch by the triggering means, but also monitoring the space of the buffer remained available by the computing means.

Applicant respectfully submits that the Erimli et al. reference fails to teach or disclose the combination of features and components recited in claim 23, as amended. Therefore, it is respectfully submitted claim 23 is patentable over the cited art and should be allowed. Claims 24 and 29-31 depend from claim 23, and should likewise be allowed over the art of record.

Rejection under 35 U.S.C. §103(a)

Claims 2-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in the subject application in view of US No. 6,628,613 – Joung et al. The Applicant respectfully traverses this rejection.

In Claim 1, the distinguishing technical features in the present invention are amended as above. Specifically, claim 1, as amended defines an alarming device that is not shown in the Joung et al. Rather, Joung et al., in column 6, lines 44-47, recites: _"If the count value of a specific packet counter exceeds a predetermined threshold value (THR), the Ethernet switch 10 considers that such input port is likely to incur a congestion and performs a flow control." Although the reference mentions that a flow control would be performed when the Ethernet switch is likely to incur a congestion, it does not teach how the devices are going to achieve the function of the flow control. This is in contrast to the present invention, in which the alarming devices are for respectively alarming when the N ports reach a threshold state and triggering one of (N-1) alarm units corresponding to the another port for stopping other data packets, in combination with other specific technical features of the flow control signal system. For example, when the switch contains the alarming device in the present invention, it will provide a better operation for real time controlling in the flow control signal system of the switch. Furthermore, the empty buffer counter and N port-packet-counters, which control the flux of the data packets using a minimum number of counters, are not taught, shown, or disclosed in the cited patents (Erimli et al. and Joung et al.). Therefore, it is respectfully submitted that claim 1 is patentable over the prior art of record, taken singly or in any combination that might reasonably suggest itself to those skilled in the pertinent arts. Since claims 2-11 depend from claim 1, it is respectfully submitted that these claims, likewise, define patentably over the art of record and should be allowable.

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In summary, it is respectfully submitted that claims 1-3, 6-11, 23, 24, and 29-40 define patentably over the art of record and should be allowed. Passage of the application to issue is respectfully requested.

Respectfully submitted,

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Amendments to the Drawings:

Please replace sheet 2 of the drawings, containing Figure 2, with replacement sheet 2, in which Figure 2 has been amended by correcting the spelling of the word "Buffer" from "Puffer". An annotated Sheet showing the change is also enclosed herewith.

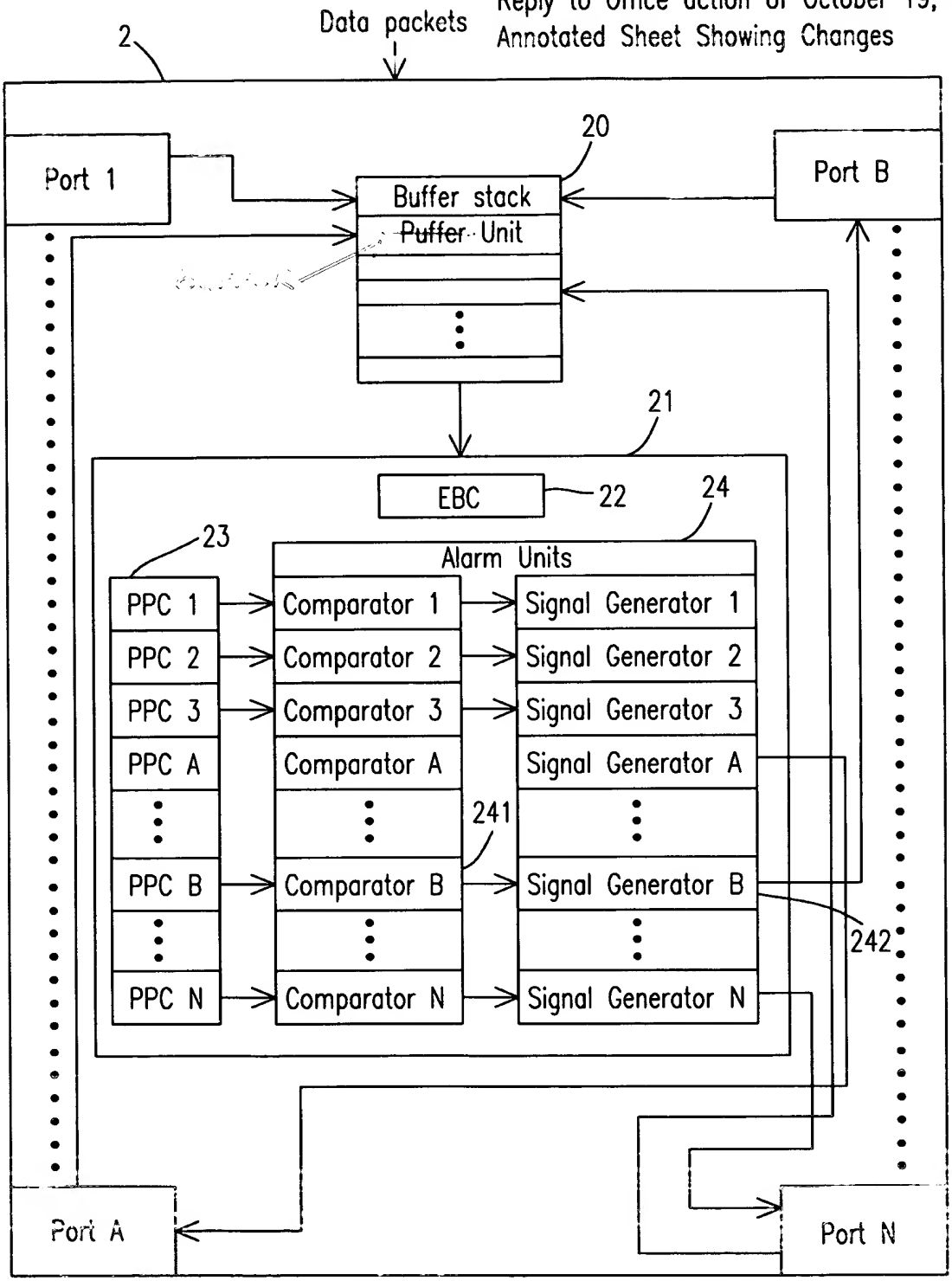
Data packets
2
Port 1
20
Buffer stack
Puffer Unit
Port B
21
EBC
22
24
23
Alarm Units
PPC 1
PPC 2
PPC 3
PPC A
PPC B
PPC N
Comparator 1
Comparator 2
Comparator 3
Comparator A
Comparator B
Comparator N
241
Signal Generator 1
Signal Generator 2
Signal Generator 3
Signal Generator A
Signal Generator B
Signal Generator N
242
Port A
Port N

Fig. 2